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ABSTRACT OF THE DISCLOSURE

A method of fabricating substrates, e.g., bulk wafers, silicon on insulator wafers, silicon on sapphire, optoelectronic substrates. The method includes providing a substrate (e.g., silicon, gallium arsenide, gallium nitride, quartz). The substrate has a film characterized by a non-uniform surface, which includes a plurality of defects. At least some of the defects are of a size ranging from about 100 Angstroms and greater. The method also includes applying a combination of a deposition species for deposition of a deposition material and an etching species for etching etchable material. The combination of the deposition species and the etching species contact the non-uniform surface in a thermal setting to reduce a level of non-uniformity of the non-uniform surface by filling a portion of the defects to smooth the film of material. The smoothed film of material is substantially free from the defects and is characterized by a surface roughness of a predetermined value.